"The tuberosity of the 7th rib articulates with the facet on the transverse process of the 8th dorsal vertebra."

"Rib articulates with the body of a vertebra and transverse process below and with the rib below at the junction of the neck and body of the rib."

"It articulates at two vertebrae and spinous processes."

"A typical rib articulates with the spinal column by its head being in apposition with the faucet of two articulating vertebras which are situated on the superior and inferior surfaces of their transverse processes. Its head is held in place by ligaments."

"7th rib articulates with the demi-facets of the two vertebrae and its tubercle articulates with the transverse process of the vertebra above."

"The head of the rib articulates with the side of the body (articular process) of the vertebra to which it is securely fastened by ligaments of white fibrous tissue. The bond of union being distributed in such a way that one rib is anchored as it were to several vertebrae."

"The head of the 7th rib articulates with the facet of the lamina of the seventh dorsal vertebra and the tubercle articulates with the facet between the seventh and eighth dorsal vertebrae."

"The 7th rib articulates with the seventh dorsal vertebra; this vertebra has an entire facet, is covered with cartilage, head of rib fits into this and is joined to the vertebra by a capsular ligament, by an anterior and a posterior ligament which fuses into the periosteum of the rib and with the anterior vertebral ligament in front and the posterior ligament behind the superior and inferior ligaments are reflections from the lateral spinal ligaments. Joint has slight area of movement."

"The seventh rib articulates with the transverse process of 6th and 8th ribs. On its upper surface it has a facet which articulates with depression in transverse process. Under surface has a like facet for similar articulation with the 8th rib. These are held together by strong fibrous bands or ligaments forming a joint with limited movement."

"The 7th rib is articulated by a ball and socket arrangement which is not so moveable as other joints but is slitely moveable and unites with the upper part of the vertebra."

"The rib (7) has four facets for articulating with the body of a vertebra and the spinous processes above and below."

The fourth question was: "Describe the plan of distribution of a typical dorsal spinal nerve." The general average was 5.3%. I judged that the general plan which did not call for naming special muscles or viscera would be an easy question, and practical, because the interpretation of pain calls for a general knowledge of nerve trunk distribution. Many of the answers to this question show that a very few of the applicants had a clear conception of the subject. There is a wealth of interesting replies but I will not weary you by quoting a long series. Two will suffice for illustration. "After the joining of the posterior and anterior roots these nerves go directly to the part of the body they are to enervate." Perhaps he knew more about it but I'm not a mind reader. "Each motor nerve is accompanied with a sensory nerve enclosed in the same sheath. The nerves pass out to the median line and from there pass down vertically sending their branches out laterally." This plan is strictly original.

Question five on "the bony landmarks of the hip and what lines determine the normal relation of the joint" brought an average of 6.8%. This question is similar to one given in the August examination. The answers show, with a few exceptions, a great lack of definiteness of knowledge of clinical or applied anatomy of the hip. A hip would have to be badly distorted to fit some of the lines proposed.

Question six asking for the nerves which "control the following muscle groups, (a) flexion of the knee, (b) extension of the knee, (c) adduction of the thigh, (d) extension of the hip, (e) flexion of the hip?" brought an average of 7.1%.

Question seven: "What viscera are behind the linea alba?" brought 8.4%. It seemed to me that every one ought to earn 10% on such a simple question as that but quite a number found it a stumbling block. Here are two answers: "The uterus in the female, the bladder and small intestines." "Stomach (portion) Transverse colon, Urinary bladder."

The averages on the other questions, diagrams, are as follows: 2 is 7.3%, 8 is 6.3%, 9 is 7.1%, 10 is 6.4%.

What has been here written brings us again to the question: "What is a Practical Examination in Anatomy?" We might precede this by another question: "Of What Use is Anatomy to the Average Practitioner?" Since such a large number fail under the test it would appear that anatomical knowledge has no active practical place in the daily experience of the medical man.

THE TREATMENT OF TUBERCULOSIS WITH INTRAVENOUS INJECTIONS OF TUBERCULIN AND ATOXYL. *

By MAX ROTHSCHILD, M. D., San Francisco.

The following paper gives a report of a number of cases of tuberculosis which have been treated with intravenous injections of Koch's Old Tuberlin and Atoxyl, with more or less rest in bed, and with a preparation of creosote and phenacetin internally. The exact method of the treatment will be explained later on. In the last four years there have been treated one hundred and eighty-three cases by this method; of these sixty-one have been incipient tuberculosis of the lungs or cases in the first stage of the disease. The rest have been cases of tuberculosis of the lungs in the second stage. Two of these patients died of miliary tuberculosis. One hundred twenty are entirely free from symptoms at the present time and practically cured. The other sixty-one patients are still under treatment and on the road to recovery.

* Read before the San Francisco County Medical Society, June, 1908.

The cases in the far advanced stage of phthisis will be dealt with at the end of this paper. The results are naturally not nearly as encouraging as in the one hundred and eighty-three cases.

The preliminary report of the first twenty-five of these cases of tuberculosis was to be read at the thirty-sixth annual meeting of the State Society of California in San Francisco, April, 1906, but the catastrophe prevented this and the report appeared in the September number, 1906, of the CALIFORNIA STATE JOURNAL OF MEDICINE.

The chief points which are of importance in the treatemnt of tuberculosis with this method are:

1. Intravenous injections of tuberculin combined with intravenous injections of atoxyl.
2. Rest in bed.
3. Fresh air.
4. Creosote and phenacetin preparation internally.
5. Diet.
6. The moral influence upon the energy and the mental condition of the patient.

It does not make much difference in my opinion what kind of tuberculin one uses. The old principle of Pasteur is still correct, namely: that any infectious matter brought into the system in such a form, dosis or virulency that it does not kill, changes the general sensitiveness of the organism; and in trying to make a subject immune, all modern methods follow this principle: To take such substances as antibodies, against which we are trying to protect the subject, this principle which von Behring has called the Isopathic principle.

In regard to active immunity, all modern methods are, more or less, modifications or improvements of the old principle of Pasteur, Toussaint and others, who brought dead bacteria, or such bacteria that were very weakened in their virulency, into the system for immunizing purposes. Thus, for instance, Kolle tried to render the German soldiers in Southwestern Africa immune to typhus, by injecting dead agar cultures into the muscles, with encouraging results. And in bubonic plague, the use of bacilli, not dead but only weakened in virulency, seems to have given even better results, according to the experiments of Strong in Manila. There is, however, one great objection to the use of these methods for practical purposes, namely: the strong local and general reaction which the vaccination causes if used subcutaneously. To overcome this local and general reaction several different methods have been essayed. The majority of authors have tried to separate the immunizing from the toxic substance. The different methods which various workers as, for instance, Conradi, Neisser, Shiga, Strong, Brieger and others tried, are well known; but none of all their preparations have gained general use or acknowledgment.

The writer in his experiments in treating tuberculosis has avoided the local reaction by injecting tuberculin intravenously. He has avoided the general reaction by using very much smaller amounts than had been used heretofore, and has increased the intervals between injections considerably. The first publication of the writer's method appeared in September, 1906, and the remarkable publication of Wright and Douglas, who also recommended most exact observation of the biologic reaction and the exact dosage of the immunizing injection, followed practically the same principles. The discovery of the opsonic theory of Wright is a wonderful progress in the treatment with immunizing substances.

Besides this principle of trying to kill microorganisms in the living being, modern research is willing to use other means to the same end, namely: the use of heterologous substances. A number of such remedies are now available. For instance, chinin in malaria and atoxyl in trypanosoma.

The use of this latter drug is to be highly advocated in the treatment of tuberculosis, and both for this and other diseases will be used, in the future, a great deal more than at present.

My attention was called to atoxyl many years back by an excellent article in the Therapeutischen Monatshefte, by Fritz Mendel of Essen. Mendel deserves great credit for advocating intravenous injections.

The writer has, for many years, used the intravenous injection of atoxyl in tuberculosis, malaria and anemias, making thousands of injections, and, with two exceptions, has never met with the serious results published by other workers. On two occasions the injections were followed by pyrexia, malaise, headache, muscular pains, nausea, cramps and diarrhea, lasting from twelve to forty-eight hours. On both occasions, the atoxyl solution was old and had a yellowish tint instead of being colorless. Since that time the writer has been very careful to use only freshly-made solutions, and he has not seen any more bad results. It is best to use a 12% to 15% solution. One gramm of this would represent 0.12 to 0.15 atoxyl. This amount of atoxyl, given intravenously, is fully sufficient to produce a marked effect and, on the other hand, it seems to be entirely safe, at least the writer has never seen the slightest indications of any trouble of the optic nerve.

Cases have been published by Bornemann, v. Kruedener, Fehr, Lesser, and especially by Prof. Robert Koch himself, in which the subcutaneous injection of atoxyl has resulted in the loss of vision. While the writer has never used more than about 1.0 to 1.5 in one month, some of the above-mentioned gentlemen have used up to 10.0 in a month, none of them less than 5.0; and the amounts which Robert Koch has used are still larger. In spite of Lassar's publication, who gives up to 0.5 per dose, the writer can not help feeling that these amounts are too large—seeing that during the last seven years he has made at least 30,000 intravenous injections of atoxyl, and in no single case have eye symptoms appeared.

There are a few people who react badly to any intravenous injection, irrespective of its quantity or nature, even salt solution producing hemolysis. These patients are not good subjects for intravenous treatment. It should always be made a rule to inject only a few drops, intravenously, the first time. The second time, if the patient has not

shown any symptoms of hemolysis, one can use the usual amount.

The combination of tuberculin solution with atoxyl has given far better results than the tuberculin alone. In cases where *very small* doses of tuberculin produce a marked reaction, it is better to follow it a few days later with an injection of atoxyl alone.

In the therapeutic use of tuberculin the fundamental rule should be "avoid reaction." In the publication of September, 1906, the writer called attention to this important fact. The publications of Wright have proved scientifically, what clinical observation had previously taught the writer. Frequent reactions, even if they are only very moderate, do more harm than good. At the same time, one can not advocate the very small amounts of tuberculin which are frequently used since Wright's publications. In the writer's opinion, the best results are achieved when the amount of tuberculin used falls just short of producing a reaction not only febrile but even malaise. Often the patient does not feel well for a day, or a part of a day, after an injection of tuberculin without having any rise of temperature. This also should be avoided, and the amount of tuberculin should be reduced at the next injection, until a point is reached where the patient feels no ill-effect whatsoever. If improvement follows, this quantity should be continued so long as improvement is maintained.

Patients who come under treatment with a temperature of over 100° at any time of the day, ought, if possible, to be kept in bed, with very light or liquid diet, until the temperature goes down, before an injection is given. The results are better and quicker if the injections are given when the patient has no fever. If, after a few weeks' rest in bed, the temperature shows no tendency to go down, injections of tuberculin, not over 100th mgr. in the beginning, should be given anyhow. It is advisable in all cases to use a fixed amount of tuberculin as a trial injection, and then to be governed by the strength of the reaction in fixing the amount of tuberculin to be subsequently used, and also the frequency of the injection. After some experience, one will quickly know how much tuberculin different patients will stand without any trouble, and, also, how often it is wise to inject. Advanced cases should receive a smaller amount and less frequent injections than incipient ones. The technic of the intravenous injections is generally known, and was fully described in the first publication.

Another point of the greatest importance in the treatment of tuberculosis of the lungs is rest in bed, and, I venture to say, that the greatest mistake in the modern treatment of tuberculosis is made in this respect. All patients with tuberculosis of the lungs should be kept in bed until all the symptoms of the disease have disappeared. This means a great deal longer than they are usually kept there. The writer is convinced that his results are so satisfactory, because he keeps his patients in bed for such a long time; this is not only in regard to patients who have fever. It is naturally a mistake to have patients with fever walk around, even if the temperature is only 1° higher than normal; but equally of patients with incipient tuberculosis who have no fever. They improve wonderfully fast in bed under the proper treatment. Sometimes six to eight weeks are sufficient, but there is no time limit. As said before, the absolute rule ought to be that all patients have to stay in bed until the chief symptoms—cough, expectoration, night sweats—have entirely disappeared. It is quite difficult to do this; usually the patients feel very well after a few weeks and they want to get out of bed. A great many patients have unfortunately not enough means, and these patients should stay in bed as long as they can possibly stay there. Those who have the means and are anxious to get up too soon, ought to be told how dangerous and treacherous their sickness is, as long as there is only the slightest sign of it left, and thus one can usually overcome their objections to staying in the sanatorium so long. In some of the writer's cases, symptoms disappeared entirely in two or three months, and the patients have been well ever since. Of course, the intravenous injections of tuberculin and atoxyl should be continued for quite a while longer, even if all symptoms have disappeared. In many cases, the patients had to stay in bed for long periods. One patient, in the third stage, was kept in bed more or less for ten months, with the satisfactory result that he got practically well. Patients with fever ought to stay in bed under any circumstances until the temperature is normal. None of the patients, for instance, who have a rise of temperature in the afternoon only, should be allowed to get up in the morning. This is the routine in different sanatoria, but it should be abolished. Of course, it is preferable to have the patients take this treatment in the fresh air and stay in bed out of doors day and night. If that is not possible, the excellent method of Dr. Dennison ought to be used.

This principle of cure by rest is pretty nearly as old as medical science itself, and it is just as important in the treatment of tuberculosis of the lungs as in the treatment of most other diseases. The publications of the good results which some authors, for instance, Murphy, Brauer, Laxer, Schell and Schmidt, have achieved with the Forlanini method in producing an artificial pneumothorax in the treatment of tuberculosis of the lungs, prove also how necessary it is to keep the diseased lung as quiet as we can possibly keep it. In some of my cases, which appeared favorable for such procedure, enforced rest of the lung has been sought by putting large strips of adhesive plaster over the diseased side, and the results have been satisfactory. It is an excellent method for relieving the pain during an attack of pleuritis.

Besides the specific treatment of tuberculosis, the internal treatment with creosote has to be discussed. We all know to-day that the expectations of Sommerbrodt, to find a specific remedy in creosote, have not been fulfilled; but, if we do get from

the use of a creosote derivative an increase in appetite, a decrease in cough and expectoration, and none of the disagreeable effects of creosote itself, on the stomach and digestion, we are satisfied.

Of the many different creosote preparations that have been used, the writer would recommend one which has given him better satisfaction than any others. It is a combination of creosote and phenacetin, in very small amounts, and it permits the taking of far larger amounts of creosote than the usual preparations. It is not necessary to say that he has used a great many different preparations during the last eight years, and, while many of them have given some satisfaction, a great many have also deranged the stomach of the patients and have so decreased their desire to eat. This combination of creosote and phenacetin has a decided influence in several respects. It increases the appetite, keeps down the temperature, and so avoids the night sweats with their weakening effect and decreases cough and expectoration. It is best given in capsules in order that the patients do not taste the creosote. As it is not irritating at all, it does not repeat, and the patients do not have the continual disagreeable creosote taste in their mouth. About a half-hour after taking, the urine becomes quite yellow in color, but otherwise it has no irritating effect on the kidneys. Pure ichthyol, in doses from sixty to three hundred drops a day, has also given good results, but many patients object to the disagreeable taste they have in their mouths for hours, after taking the medicine. The same is to be said of geosote, a combination of guajacol-carbonate and valeria.

The last point to which I should like to call your attention is the influence which the physician ought to exert upon the mental condition of the patient. Some patients, who know that they have tuberculosis, are extremely optimistic and do not seem to realize the danger in which they are. Others, who do realize their condition fully, are too much depressed and have practically given up every hope of recovery. It ought to be made a practice to enlighten every patient, who has a chance to get better, in regard to his condition. Such patients, who are too optimistic, ought to be told that they are seriously ill and that they will die, if they do not make up their mind to live fully and strictly up to the directions which the physician will give. Others, who are discouraged from the beginning, ought to be told that they will undoubtedly get well if they carry out directions properly, if they are cheerful, and help all they can. Nothing has a better effect on the mental condition of all patients than the gain in weight; and with that, we come to another point of great importance in the treatment of tuberculosis, namely, the question of diet.

I do not believe that patients who are sick for such a long time, as patients with tuberculosis usually are, ought to keep one fixed diet. It is much better to give them a varied diet and to cater to their appetite as much as their digestion will allow us to do than to write out a limited dietary for them, of which they will get tired very soon; but, with varied diet, the patients ought to take from four to eight eggs daily and from one to three quarts of milk. If they can not take the milk pure, they can get it in some changed form—Eskay's Food or rice milk, or any similar preparation. The Russell emulsion is to be recommended very highly as part of the daily diet. The overfeeding of tuberculous patients helps in various ways. A well-nourished system is naturally more resistant than a system that is underfed, and, besides that, the moral effect on a patient who has been losing in weight and who, all of a sudden starts in again to pick up and gain in weight, can not be underestimated. The patient becomes more cheerful and is more willing to carry out the orders strictly, as soon as he notices the continual improvement in weight.

Of the one hundred and eighty-three cases of tuberculosis in the first and the second stage of the disease, I would like to give you the history of a few cases—some of them as typical examples of the treatment and its results, and some because they might be of special interest. The rest of the one hundred and eighty-three cases will be published at some other time.

Mr. H. W. R., Napa. Age 40 years. Married seventeen years. Mother died of tuberculosis. Patient has been a heavy cigarette smoker for years. Used thirty to forty cigarettes daily. In April, 1907, he commenced to cough and lost weight, gradually, from 156 to 132 pounds. Much expectoration. Night sweats and shortness of breath. Four days ago severe hemoptosis. Patient went to the Walker Sanatorium October, 1907. Numerous T. B. in sputum. Dullness in left lobe. Rough bronchial breathing and rales. Stayed in bed about three months, then discharged from hospital. No more cough or expectoration. Breathing in left upper lobe a little harder than normal. Otherwise no other symptoms. Weight, 165 pounds. Microscopical examination of sputum made before the patient left the hospital, by Dr. Agnes Walker, showed absence of tubercle bacilli. Dr. Moffitt was kind enough to examine the patient for control and found the same condition. Patient is in excellent health at present time.

Frank E. M., Needles, California. Referred by Dr. Shepard, Needles. Civil engineer and surveyor. Age 35 years. No hereditary element. October, 1907, an attack of pleurisy and three to four days afterwards, blood in sputum. Ten days later hemoptosis. Microscopical examination by Dr. Shepard in Needles shows tubercle bacilli present. Examination shows rough breathing in both apices and dry rales during in- and exhalation. After being in bed for about three months, no more symptoms. The little sputum which the patient expectorated in the last month of the treatment was examined by Dr. Agnes Walker and myself and was free of tubercle bacilli. Dr. Moffit kindly examined the patient for control, before he left for home, and could not detect symptoms with the exception of slightly harsh expiratory breathing at the left apex. Gain in weight, thirty pounds.

William C. Pilot, 32 years old. In October, 1907, severe cold. Cough and expectoration ever since. also night sweats. Patient came for examination January 22nd and had a very heavy hemoptosis. He was sent to the Walker Sanatorium, where he had another very heavy hemoptosis. Examination showed tuberculosis of the right apex, rales and the other usual symptoms. Numerous tubercle bacilli in

sputum. Heavy expectoration, about one-half a pint in twenty-four hours. This case is interesting, because it is the fastest recovery of all cases that have been treated. Patient was in bed seven weeks and left the hospital free from symptoms. Examined for control by Dr. Moffitt. Patient gained about forty-five pounds and seems to be in perfect health at the present time and doing again night service on one of the boats on the bay.

Mrs. W. E. Th. School teacher. Age 33 years. In good health until four months ago, when patient contracted severe cold followed by cough, expectoration and severe hoarseness, which became gradually so bad that patient lost the voice entirely. Was treated for ulceration in throat by a specialist for about three months without result. Then patient went to Dr. Pischel, who referred her to me. Tubercle bacilli in sputum. Typical reaction after tuberculin injection. The history, which is most interesting on account of the rapidity of the improvement, is best given by Dr. Pischel's report: "Mrs. Wm. E. Th. March 20th, 1908. On posterior wall of the larynx two serrated ulcers. May 14th, 1908. The place of the former ulcers marked by pale spots. Ulcers apparently healed. Dr. Kaspar Pischel."

The only treatment consisted in intravenous injections of tuberculin and atoxyl. The voice of the patient is normal. There is no more cough nor expectoration.

Mrs. J. N., Richmond, Contra Costa county. Referred by Dr. S. Boyd, San Francisco. Age 47 years. Farmer's wife. Healthy until four years ago. Eighteen months ago dyspnoe slowly appeared, with loss of weight, cough and night sweats. Lost twenty-seven pounds.

Condition: February, 1907. Extreme weakness and pallor. Right thorax absolutely dull. Vesicular breathing absent. Harsh breathing and rales at right apex. Heart dislocated three inches to the left. Marked abdominal ascites, containing a large floating tumor above symphysis pubis. Both ovaries, examined per vaginam, show tumors.

Diagnosis: Pleuritis tuberculosa, peritonitis tuberculosa, fibroma uteri, ovarian tumors. February 9, 1907, paracentesis thoracis was performed at the St. Thomas Hospital, Dr. Pressley assisting. This was repeated six times, eleven quarts of typical tuberculous serum being removed. With the expansion of the lung, large and small sized rales appeared both in ex- and inhalation. On March 12th, Dr. Boyd performed laparotomy, removing a uterine fibroma and a small tumor from the right and a large tumor from the left ovary (found by microscopical examination by Dr. Blair to be spindle-celled sarcomata). Typical general tuberculosis of the peritoneum was present and much ascitic fluid. Abdominal cavity washed with normal salt solution. Intentio prima. A week later intravenous injections of atoxyl and tuberculin were commenced, from which time on improvement was uninterrupted. The appetite became excellent, and cough, expectoration and sweats gradually disappeared. Weight increased from one hundred and eleven pounds on March 25th to one hundred and eighty pounds on December 7th, by which time all pulmonary symptoms had disappeared and the patient was discharged well and has so remained.

All the rest of the one hundred and eighty-three cases are more or less similar to the cases of which I have given the histories. In some cases it took a longer time, in some cases a shorter time to get them well, but all got well or are on the road to recovery. In none of the cases has there been a relapse, and, even in most of the cases of the third stage, there has been a decided improvement in the condition of the patient, if only for a certain length of time.

Before closing this paper, it might be advisable to say a few words about the effect of the treatment in a great many of these cases of tuberculosis in a very advanced stage which we all see so very often. The results are, of course, always doubtful in such cases, and often I have been forced to tell the relatives of the different patients, to take them home after a short period of observation. It is advisable, even in cases that make a bad impression at the first examination, to put the patient to bed for a couple of weeks for observation. It happened to me several times that I did not think the patient had a chance to get better after the first examination, but, after the patients had been in bed for a little while, they showed improvement, and then under continual and strict care and treatment, got well. I would like to give the history of one of these cases sent to me by Dr. Shepard in Needles:

Man 20 years old. Father died of tuberculosis. About fifteen months ago patient had grippe, followed by cough and expectoration and night sweats, and two attacks of hemoptosis; the first a year ago, the second March, 1907. Past weight one hundred and thirty-eight pounds. Weight at present time about one hundred and twelve pounds. Patient went to the hospital in June, 1907. His morning temperature varied between 101° and 102°; his afternoon between 103° and 104°. The apices of both lungs were badly affected. A large cavity in the left upper lobe. Interrupted breathing left lobe. Normal breathing in the right middle and lower lobes. Patient stayed in bed more or less for seven months under the usual treatment. Then he returned to Needles practically well. No fever, dyspnea, nor night sweats, scarcely any cough or expectoration. Weight one hundred and forty-five pounds. He is still under treatment with Dr. Shepard, as it was considered better to have him keep up the treatment for a while longer.

Now, if you will permit a short resume of the most essential points, the author would like to state that tuberculosis of the lungs in the first and second stage, if properly treated, is a most curable disease; but it is not sufficient to take one feature of the modern treatment and to neglect the others. Results are dependent on a proper combination of them all, nor ought there to be discouragement, if the first cases do not promptly respond in a satisfactory manner. It takes some experience, which, however, is easily obtained, to use any kind of tuberculin intravenously, but every practitioner can use it and can treat his patients successfully, if he diagnoses them early enough and if able to acquire the help of the patient. It would, indeed, be a great satisfaction if we did not see so many cases in the last stages, which come too late for treatment and which are doomed to die. The use of tuberculin and atoxyl intravenously, absolute rest in bed, combined with fresh air treatment, where it is possible, overfeeding and some good creosote preparation internally, and, with it all, the stimulation of the energy and enthusiasm of the patient; these are the important features, and, if to them the physician adds his own energy and enthusiasm, good results will undoubtedly be obtained.

Discussion.

Dr. D'Arcy Power: It seems to me that in a matter of this kind we must be guided by results. The

whole question of immunity, the whole question of bacterial vaccination, as to how far it is successful or not successful, is still to some extent an open question. I believe that Wright is in the right course. Yet there is not by any means a uniformity of opinion, either in regard to the therapeutic basis of his work or to the results that he has attained, and for that reason I believe, when we are dealing with such a method of treatment as has been brought forward by Dr. Rothschild to-night, that the subject must be judged by results, and results only. If Dr. Rothschild can show by a sufficient number of cases that intravenous injection is the right route, we must abide by the results of practice rather than be bound by theory. I hope that this matter will receive more attention from all of us, and I intend to follow it further.

Dr. Moffitt: I wish to say a word in regard to the use of tuberculin in general. Dr. Rothschild has sent a few of these patients to me to look over after he had them to all intents cured. I have been very much interested in his work, as we all must be, but I would raise my voice in caution rather than in commendation. I have in mind several patients treated with old tuberculin, who did remarkably well. I also have in mind other patients who were going quickly with acute tuberculosis, who are absolutely well to-day with no other treatment than rest and creosote. I have in mind, also, a number of patients whom I have seen during the last month, who are industriously using tuberculin without proper clinical spervision. I would emphasize what Dr. Rothschild said in his paper, that we must measure the reaction often by symptoms of the patient and by the sensations they have about their local lesions. I think a large part of Dr. Rothschild's results must be referred to his management of his cases rather than to his use of tuberculin. He instills his patients with his enthusiasm, keeps them quiet and feeds them properly and regularly. I am very enthusiastic about some of the patients I have seen, who have returned to their work after his treatment, but we must not go wild over the use of tuberculin.

Dr. Rene Bine: As to the preparation which is to be used in the injection treatment of tuberculosis, I should say that there are many clinicians in Europe who are obtaining excellent results with old tuberculin, just as with the new. In fact, it has been demonstrated that good results ought to be obtained with almost any preparation, provided that it be properly administered. Sahli favors Beraneck's, others favor Deny's, though, of course, the new tuberculin is now enjoying the greatest vogue. As regards the methods of administration, Koch having found that the power of agglutination which had been obtained by treating patients with tuberculin subcutaneously could be still further raised by intravenous injections, advocated this method as early as 1901. It was, however, very soon demonstrated that the same degree of immunization could be regularly obtained by the use of oft-repeated mild doses subcutaneously employed, and the intravenous method was promptly abandoned. The pulmonary administration of tuberculin advocated in 1904 has had practically no followers. The work of Wright has shown that mild doses are better than large ones. The reaction follows each dose, this reaction being determined by the estimation of the opsonic index, and Wright has claimed that by these determinations alone can one gauge the doses to be administered. Wright determines the index twice a week of cases which come to his laboratory. My experience has taught me that the index in most ambulatory cases of pulmonary tuberculosis fluctuates from day to day, and I therefore believe that to be of any avail, leaving aside the question of accuracy of technique of index determinations, one should have to test the patient's blood at least once daily at the start of any course of treatment. If I remember correctly, in the first report of Dr. Rothschild he speaks of injecting a dose of tuberculin sufficiently large to produce a reaction, the size of which is an indication for his further dosage. I should think that this preliminary injection would be a dangerous one, and therefore I should like to have Dr. Rothschild explain just how he graduates his dosage afterwards.

Dr. Rothschild (closing): I can not agree with Dr. Evans in claiming that the intravenous injection is harmful. In fact, I consider it the most harmless method a physician can use if he uses it properly. During the last nine or ten years I have made a great many thousand intravenous injections, and I have never seen any bad effects—for instance, thrombosis. But of course the injection has to be given correctly without damaging the intima. Dr Evans also objects to the use of the old Koch tuberculin and thinks that different other tuberculins give better results. I can only say that I have had the best results with the old tuberculin, but I believe that most tuberculins will give good results if they are only used carefully. The question of immunity is not yet clear, and also Wright's theories are not absolutely above reproach. Wright's index is hard to use; for the general practitioner, pretty nearly impossible, and we have to be guided by the practical results, they count more than anything else, as Dr. Power stated very correctly. I agree with Dr. Moffitt who says that it is very necessary to be extremely cautious with the tuberculin. It takes a good deal of experience to use tuberculin. The fact that the tuberculin was not used correctly was the reason that its use was given up by most physicians, and only in the last few years, since we know how to use it, it has been taken up again. I claim to be the first one who recommended such small amounts of tuberculin and the strict avoidance of reactions. My first publication appeared before Sahli's publication, which Dr. Moffitt mentioned.

THE ITCH.*

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With a fine eye out for something with vim and snap in it the Scotch took the thistle for their emblem. In like manner the itch, their national disease, is stimulating and lively and has nothing of the languor and introspective misery of the American neurasthenia. This dis-ease, this disquietude, this brisk inconvenience is supposed to be so readily recognizable and so simple to treat as hardly to require serious consideration, and as for its acquisition, that is looked upon in the nature of a joke by those who do not have it.

In regard to the diagnosis one is told to find the burrows and the itch mite, and the incident is closed. These things being found the incident, as far as the diagnosis is concerned, is closed, but frequently, as recently remarked, it is not so easy to find the burrows and the mite.[1] We must also remember it is the simple things that escape one. I know that I myself have made errors in the diagnosis of the itch, as I have had the good fortune to correct some of these at a subsequent visit. At other times I have caught myself on the verge of making a mistake by recognizing some characteristic feature of the malady, for example, a pustular eruption on an infant's feet with the little one vigorously rubbing its

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